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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/643,015

08/18/2003

Todd S. Emrick

7163

2962

22922

7590

06/30/2006

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EXAMINER

FEELY, MICHAEL J

ART UNIT

PAPER NUMBER

1712

DATE MAILED: 06/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/643,015

**Applicant(s)**

EMRICK ET AL.

**Examiner**

Michael J. Feely

**Art Unit**

1712

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 12 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 6-11 is/are allowed.
- 6) ☒ Claim(s) 1-5, 12-15, 18 and 20-23 is/are rejected.
- 7) ☒ Claim(s) 16, 17, 19 and 24-26 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

***Pending Claims***

Claims 1-26 are pending.

***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 12, 2006 has been entered.

***Previously Filed Declaration***

2. In the Office action dated April 1, 2005, it was noted that the declaration filed on December 13, 2004 under 37 CFR 1.131 was sufficient to overcome the Dubertret et al. reference (Pub. No.: US 2004/0033345). After further review of this declaration, it has been realized that only one inventor, Habib Skaff, signed it. Hence, it is ineffective to overcome the reference. Accordingly, the previous rejection will be reinstated below. In order to overcome this reference, the declaration would have to be resubmitted and signed by both Habib Skaff and Todd S. Emrick.

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***Previous Claim Rejections - 35 USC § 112***

3. The rejection of claims 1-10 under 35 U.S.C. 112, first paragraph, has been overcome by amendment.
4. The rejection of claims 14, 15, 18, and 20-23 under 35 U.S.C. 112, first paragraph, has been withdrawn. This rejection was overcome by the amendment filed August 1, 2005.

***New Claim Rejections - 35 USC § 112***

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:  

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
6. Claims 12 and 13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 12 and 13 recite the limitation "the ligand component of claim 11". There is insufficient antecedent basis for this limitation in the claim. Claim 11 has been amended to recite "A polymeric compound".

***Previous Claim Rejections - 35 USC § 102***

7. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
8. The rejection of claims 11 and 12 under 35 U.S.C. 102(a) as being anticipated by Billancia et al. (*see entry A7 on IDS dated 2/7/05*) has been overcome by amendment.

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9. The rejection of claims 2 and 3 under 35 U.S.C. 102(a) as being anticipated by Billancia et al. (*see entry A7 on IDS dated 2/7/05*) has been withdrawn.

10. The rejection of claims 1, 4, and 5 under 35 U.S.C. 102(a) as being anticipated by Billancia et al. (*see entry A7 on IDS dated 2/7/05*) stands for the reasons of record.

Regarding claims 1, 4, and 5, Billancia et al. disclose: **(1)** a composite comprising a metallic nanoparticulate substrate component (p.508: introduction; Figures 1a & 2) and a polymeric ligand component (p.508: introduction; Figures 1a & 2), said ligand component comprising a nitrogenous coupling moiety coupling said ligand component and said substrate component (p.508: introduction; Figures 1a & 2);

**(4)** wherein said polymeric ligand component is selected from poly(ethylene glycol), poly(hexaethylene glycol), poly(hexadecylethylene glycol), poly( $\epsilon$ -caprolactone), poly(lactide), poly(glycolide), polyglycidyl, polypropylene oxide and combinations thereof (p.508: introduction; Figures 1a & 2); and

**(5)** wherein said polymeric component comprises poly(ethylene glycol), said component with a terminus comprising a functional group moiety selected from hydroxyl, alkyl, alkoxy, carboxylate, thymine, ammonium salt and substituted ammonium salt moieties (p.508: introduction; Figures 1a & 2).

Billancia et al. provide two different functionalized nanoparticles: one made from Pd metal clusters (*see Figures 1a & 2*); and one made from CdS metal clusters (*see Figures 1b & 3*). With the Pd materials, the absence of terpyridine peaks in Figure 2 indicates a metal-ligand coordination, as depicted in Figure 1a. With the CdS materials, the presence of a terpyridine

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peak suggests the presence of uncoordinated terpyridine, as depicted in Figure 1b. Accordingly, the teachings do not apply to the limitations set forth in claim 2.

11. The rejection of claims 11 and 12 under 35 U.S.C. 102(e) as being anticipated by Ekwuribe et al. (US Pat. No. 6,380,405) stands for the reasons of record.

Regarding claims 11 and 12, Ekwuribe et al. disclose: *(11)* a polymeric compound comprising pyridine ligand substituted with a poly(ethylene glycol) component (column 17, lines 1-44) comprising at least 2 ethylene glycol monomers and a terminus comprising a functional group moiety selected from hydroxy, alkyl, alkoxy, carboxylate, thymine, ammonium salt and substituted ammonium salt moieties (column 17, lines 1-44); and *(12)* comprising up to about 100 ethylene glycol monomers (column 17, lines 1-44).

12. The rejection of claims 1 and 3 under 35 U.S.C. 102(e) as being anticipated by Gaw et al. (Pub. No.: US 2003/0124194 A1) has been overcome by amendment.

***Reinstated Claim Rejections - 35 USC § 102***

13. Claims 1-5, 14, 15, 18, and 20-23 are rejected under 35 U.S.C. 102(e) as being anticipated by Dubertret et al. (Pub. No.: US 2004/0033345).

Regarding claims 1-5, Dubertret et al. disclose *(1)* a composite (paragraph 0017) comprising a metallic nanoparticulate substrate component (paragraphs 0018-0022) and a polymeric ligand component (paragraphs 0034-0037), said ligand component comprising a nitrogenous coupling moiety coupling said ligand component and said substrate component

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(paragraphs 0051, 0056-0057, and 0066-0067: *indirectly linked via the hydrophobic core layer*); (2) wherein said substrate comprises a nanoparticle selected from CdSe, CdS, CdTe, ZnS, ZnSe, Co and combinations thereof (paragraphs 0018-0022); (3) wherein said nitrogenous moiety is selected from amino, pyridinyl and aminopyridinyl moieties (paragraphs 0056-0057 and 0066-0067); (4) wherein said polymeric ligand component is selected from poly(ethylene glycol), poly(hexaethylene glycol), poly(hexadecylethylene glycol), poly( $\epsilon$ -caprolactone), poly(lactide), poly(glycolide), polyglycidyl, polypropylene oxide and combinations thereof (paragraphs 0056-0057 and 0066-0067); and (5) wherein said polymeric component comprises poly(ethylene glycol), said component with a terminus comprising a functional group moiety selected from hydroxyl, alkyl, alkoxy, carboxylate, thymine, ammonium salt and substituted ammonium salt moieties (paragraphs 0056-0057 and 0066-0067).

Regarding claims 14, 15, and 18, Dubertret et al. disclose (14) a system for nanoparticle dispersion, said system comprising: a composite comprising a nanoparticulate substrate (paragraphs 0018-0022) and a first ligand component (paragraphs 0032-0033), said composite in a first liquid medium (paragraphs 0032-0033); and a second ligand component in a second liquid medium, said second ligand component at least partially soluble in said second liquid medium (paragraphs 0034-0037) and selected from poly(ethylene glycol), poly(hexaethylene glycol), poly(hexadecylethylene glycol), poly( $\epsilon$ -caprolactone), poly(lactide), poly(glycolide), polyglycidyl, polypropylene oxide and combinations thereof (paragraphs 0056-0057 and 0066-0067), said second ligand component comprising a nitrogenous coupling moiety (paragraphs 0066-0067); (15) wherein said second ligand component has an affinity for said nanoparticulate substrate greater than said first ligand component (paragraphs 0032-0037, 0051, 0056-0057, and

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0066-0067); and **(18)** wherein said nanoparticulate substrate comprises CdSe (paragraph 0021) and said second ligand component has an affinity for said nanoparticulate substrate greater than said first ligand component (paragraphs 0032-0037, 0051, 0056-0057, and 0066-0067).

Regarding claims 20-23, Dubertret et al. disclose **(20)** a method of using ligand solubility to disperse a nanoparticulate substrate (paragraphs 0010-0012 and 0017), said method comprising providing a composite comprising a nanoparticulate substrate (paragraphs 0018-0022) and a first ligand component (paragraphs 0032-0033); and contacting said composite with a second ligand component, said second ligand component in a second liquid medium (paragraphs 0034-0037), said second ligand component comprising a nitrogenous coupling moiety (paragraphs 0066-0067) and at least partially soluble in said second liquid medium (paragraphs 0034-0037), said contact with said second ligand component dispersing said nanoparticulate substrate in said medium (paragraphs 0010-0012 and 0017 and 0034-0037); **(21)** wherein said substrate comprises a nanoparticle selected from CdSe, CdS, CdTe, ZnS, ZnSe, Co and combinations thereof (paragraphs 0018-0022); **(22)** wherein said polymeric ligand component is selected from poly(ethylene glycol), poly(hexaethylene glycol), poly(hexadecylethylene glycol), poly( $\epsilon$ -caprolactone), poly(lactide), poly(glycolide), polyglycidyl, polypropylene oxide and combinations thereof (paragraphs 0051, 0056-0057, and 0066-0067); and **(23)** wherein said polymeric ligand component comprises poly(ethylene glycol) (paragraphs 0056-0057, and 0066-0067).



***Response to Arguments***

14. Applicant's arguments, see page 6 of the response, filed April 12, 2006, with respect to the terpyridine ligand of Billancia et al., have been fully considered and are partially persuasive. The rejection of claims 3, 11, and 12 has been withdrawn because the terpyridine ligand does not correspond to a pyridine ligand. However, the terpyridine ligand does satisfy the limitation of "nitrogenous moiety". Accordingly, the rejection of claims 1, 4, and 5 over Billancia et al. stands.

15. Applicant's arguments, with respect to Ekwuribe et al, filed April 12, 2006 have been fully considered but they are not persuasive. The pyridine ligand set forth in Ekwuribe et al. is substituted with both an alkoxy terminated PEG and an oxygen-bound moiety. The language of claims 11 and 12 does not exclude the presence of substituents other than said PEG component.

***Allowable Subject Matter***

16. Claims 6-11 are allowed.

17. Claims 16, 17, 19, and 24-26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

18. Claims 12 and 13 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

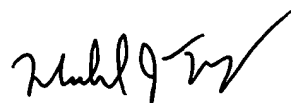
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*Communication*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J. Feely whose telephone number is 571-272-1086. The examiner can normally be reached on M-F 8:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on 571-272-1302. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Michael J. Feely  
Primary Examiner  
Art Unit 1712

June 23, 2006

**MICHAEL FEELY**  
**PRIMARY EXAMINER**